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ABSTRACT

Recent research which focuses on organizational differences in the brains of males and females has an important impact on the way women are portrayed in the male-dominated mass media. Generalizations from highly speculative research findings conclude that information is gathered and problems are solved differently by men and women. Most generalizations are stated in terms detrimental to women. For example, the statement that men do better in mathematics implies that lateral functions are superior. What is ignored is that women do much better on verbal testing than men. The relationship between mass-mediated images and brain research centers on the function of the left brain (the articulate, conscious self) and the right brain, which processes visual images. When the right brain is accessed during sleep, the individual is being creative and developing solutions to problems. However, because a vast amount of images are received through the mass media, which create fundamentally male images (e.g., violence), such images are not optimally suited for female processing. Thus, the right brains of women are hampered in finding solutions to problems suitable to the way their brain sees the world. Women's culture needs to find its way into the mass media. (Author/KC)

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Women's Visions/Visions of Women:

Brain Research and Its Implications for the Mass Media

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Prepared for the National Women's Studies Association Conference

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Scarcely any educated American exists who has not heard something about the split brain and fascinating studies documenting and illustrating the special skills of each hemisphere. In fact, the growing public awareness of this research and the award of the Nobel Prize to Roger Sperry of Caltech recently for research begun more than fifteen years ago are not unrelated. Brain research is a hot topic, and, perhaps because it deals with what western minds see as the essence of self, the seat of individual identity--the brain--it is becoming increasingly politicized. Since my initial decision to write about brain research and its relationship to the mass media, the controversy involving the research itself has heated up to the boiling point. Fueled, perhaps, by the 1980 report by John Hopkins' Camilla Benbow and Julian Stanley that there might be "endogenous" differences between males and females in math ability,[1] the question of whether or not there are basic differences between male and female brains has become a highly charged issue requiring feminist attention. In the last few months, the battle to determine the exact meaning of split brain research has moved out of the scientific community and is being waged on the pages of Playboy and Ms.[2] Although I certainly cannot resolve all of the questions raised by this research, I can summarize the battle lines and indicate how deeply important, how essential, it is for feminists to understand the implications of this research, especially at that point where it intersects with the mass media.

First, let me attempt to provide a minimally sufficient summary of the state of split brain research. As a result of work done by Sperry, Eccles, Gazzaniga and others over the last decade, the human brain has begun to yield up some of its mysteries.[3] In the first place, it has become clear that each of us has two separate brains inside our heads. Researchers working with severe epileptics who have had their corpus callosa surgically severed have discovered how different the two brains are. For those of us who are right

handers (and for many left handers as well), the function of each hemisphere is highly specialized.[4] The left hemisphere--that controls the right hand, the right ear and the right visual field of each eye--is the seat of linear processes, of language and other verbal abilities. The right hemisphere--controlling the left hand, the left ear, and the left visual field of each eye--is the seat of visual and spatial abilities, of pattern recognition, of holistic or gestalt rather than linear processes. There is, in normal individuals, communication between these two hemispheres via the corpus callosum, a band of fibers connecting the two parts of the brain.

If I had written this paper several years ago, then my task would have been much easier. At that time, it was the general understanding that the right hemisphere, with its holistic way of organizing perception, was "eastern," intuitive, "female" and that the left, linear hemisphere was "western," logical, and "male."[5] Yet within the last year, brain power has been divided up between the sexes in a much more complex, ultimately much more dangerous, fashion. Recently, some brain researchers and the lay publicists have claimed parts of the right hemisphere for males, up-grading holistic perception and downgrading linear ways of organizing perception. To my knowledge, Vivian Gornick, in a recent article in Ms has been the only feminist to respond to this redistribution of the brain's abilities between the sexes.

Despite the fact that over the last several years the left hemisphere was seen as male and the right as female, researchers had described the brain as a single entity much resembling the Chinese Yin-Yang symbol.[6] Each of us was seen as having a dual consciousness; psychologists such as Robert Ornstein wrote frequently about the "complementarity of these two modes of consciousness" within each of us.[7] Now the times have changed, and hemispheric differences are being touted as proof that men and women differ

in some more profound ways than external genitals would account for. Biology is destiny, or as Playboy put it this March, sex is "between your ears as well as your legs."[8] What is curious, though, is that after centuries of being accused of being devious, round-about, anything but linear in their thought processes, women are suddenly being told that it is, in fact, men who are capable of simultaneous integration and that women are the sequential reasoners.[9] And "curiouser" still, we are being told that simultaneous is much better than sequential. Linear means rigid; holistic means male.

What then is the state of the controversy with respect to the brain? How are the sexes envisioned? In the first place, as Playboy and I could here quote Time or Psychology Today with much the same effect) sums it up, the "conventional wisdoms of science delivered up to us in the Sixties and Seventies about sex and gender identity" are passe, replaced by the hard, scientific facts of the Eighties.[10] Hormones are being touted as the key. Not only accounting for differences in body hair, genitals, distribution of body fat and the like, hormones are seen as accounting for basic organizational differences in the brains of men and women. Testosterone is seen as the key male and female differences.

If as Playboy asserts "learning" may have little to do with how we behave, then clear lines dividing male and female can be drawn finally and absolutely. Those who are publicizing this new information are not ignorant of the political implications behind their claims. In fact, they seem to want the information politized. Jo Durden-Smith and Diane Desimone, co-authors of the seven part series on the differences between men and women that appeared this year in Playboy, mention more than once that their findings will disturb some people: "It is no wonder, then, that feminists and homosexuals, as well as scientists from all fields, are beginning to join the fray."[11] The implications are clear; "normal" people won't be bothered

by all of this, but feminists (or radical feminists at least) and homosexuals will be. They seem to be betting on paronoia to increase at least tacit acceptance of their position. And they are aware of the political message behind their position:

> For if the claims of nature--against those of nurture--are upheld, then it may be that we will have to give up the struggle to make Jenny and Johnny alike, in an attempt to do away with the sexual inequalities of the past; Jenny and Johnny may be born with intrinsically different abilities and skills, acquired through evolution. And it may be that we will have to accept that fact that those who become homosexual in adult life are not in some sense 'made' by the environment in which they were brought up. Nor are they a product of free choice. Rather, they were <u>born</u> homosexual. . . ."[12]

Everything is conveniently and irrefutably explained by the differing hormones in men and women.

What is frightening to me is the ways in which these differences--real or learned--are being supported from research data. Research data is being amassed and interpreted to support the idea that brain differences are significant. Although there are a number of researchers who are cited,[13] several keep being mentioned because their work supports the thesis that there are significant differences between male and female brains and that these differences are the result of hormone actions on developing brain tissue. The biggest interest seems to be in proving males to be different (that is, better) than females. Mark Gurney at Caltech, whose animal model is the female zebra finch, for example, has used hormones to create male behavior in female finches. By manipulating the level of male hormone in the female finch, Gurney was able to make her sing, when only males had sung before.[14] Research of this sort becomes a model because it "proves" that male hormone is responsible for the little extras in a species. Therefore, it paves the way for the assertion that testosterone, and its related hormones, gives male brain development a significant edge. Roger Gorski at UCLA is another

researcher whose work is mentioned in this context.[15] His animal model is the rat, and by administering male hormones to female rats he has been able to change their behavior. Gorski has noted that male rats "run mazes better than females," just as male humans seem to do better on mazes than females do. When male hormones are given to females or castrated males, their maze-running abilities improve. What is of special interest in Gorski's work is that he has found that there are differences in the sizes of parts of the brain of male rats when compared to female and castrated rats and that the difference in these brain sizes corresponds to the ability to run mazes. In males, the part of the brain used in running mazes is larger.

The conclusion is this: hormones--that is, male hormones--change the structure of the brain itself. Robert Goy at Wisconsin is doing research similar to that of Gorski but with rhesus monkeys.[16] By manipulating the level of male hormone in females, he can cause them to engage in "male behavior." In search of human proof that male hormones cause fundamental changes in behavior and by implication brain structure, researchers have looked at DES daughters.[17] Because these women received DES in utero and because DES is derived from the hormone stilbestrol, researchers have assumed that they could find evidence of male behavior in these women. DES has been used to suppress lactation and causes a growth of facial hair in women. They expressed no surprise that DES daughters tend to be "'tomboyish,' play less with dolls; they're less motherhood-oriented and more career-oriented; they date later; and they <u>may</u> be of above average intelligence."[18] The limitations of this data and its absence of analysis of social variables aside, this research is clear in its implications. Male hormones create different behavior, different brains.

At this point, I cannot refute or assert the claims that there are basic brain differences between men and women (and indeed that isn't the focus of

my paper), but I do want to offer some observations. First of all, not all scientists view these differences as actual or significant. Jerome Kagan, a psychologist at Harvard raises some interesting and pertinent questions about research by Daniel B. Hier and William R. Crowley Jr. reported in the New England Journal of Medicine.[19] The article reported that among men spatial ability may be influenced by sex hormones. Kagan points out that men with sex hormone deficiencies since puberty--they tested lower in spatial ability than did healthy men--might well have had impaired scores because of inferiority complexes about their medical conditions. John Money at Johns Hopkins puts it more bluntly:

> The whole concept of androgen deficiency and spatial ability as far as I'm concerned, is hogwash until somebody can measure that the actual brain cells that are supposed to be using androgen are unable to use it and don't have it. . . .[20]

What the political manipulators of brain research are doing is making concrete castings of highly speculative data. This is what they have decided brain differences in males and females add up to.[21] Women are more sensitive to touch, tastes, and odors, especially at mid-cycle. They have better fine-motor coordination and finger dexterity. Information is gathered differently and problems are solved differently by men and women. Men are single-minded, narrowly focused, not easily distracted, more persevering, more rule-bound. Women are more sensitive to context, less rule-bound, good at picking up peripheral material, more easily distracted. Women communicate; men take action. Men are better at maps, mazes, rotating objects in their minds, mathematics, and have a better sense of direction. Women excel in language, but because they are less sensitive to light, they do not do anything involving object manipulation as well as do men. Women are better at verbal reasoning; men at mathematical. Men are better at spatial perception. Women are more sensitive to sounds--sounds seem louder; they are comforted by

speech; they are more adept at communication and they can "sing in tune six times more often than males can."[22]

Is this the correct visualization of the sexes anywhere let alone in all cultures, in all places? The question has not been resolved. Although in some studies differences between male and female cognitive abilities have been noted, the differences have been very slight: "Sex differences in higher mental functions are typically on the order of one-quarter of a standard deviation."[23] This means that there is an enormous overlap between the abilities of males and females. Most responsible scientists who see a difference in male and female abilities "temper any suggestion that sex be used as a major criterion, by itself, for determining career options and educational opportunities."[24] Other scientists such as S. F. Witelson, however, have already suggested that sex differences in brain organization ought to be used as the basis of creating elementary school curricula suited to the abilities of each sex. Such an approach denies the importance of individual differences and has profound implications when considered in terms of the mass media.[25]

Such an approach is bound to create differences in behavior and expectation where none may exist inherently. New research carried out at Langley Porter Institute in California, and mentioned by Gornick,[26] found that there was no difference at all in left and right brain functioning. Whatever the actual data, generalizations are being created that are detrimental to women. Some initial data suggests that males and females may be lateralized differently. That is, males may be more lateralized than are females. This is offered as the major reason why males seem to do better in mathematics than do women. This would make it seem that it is better to be completely lateralized. What is ignored is that women, who are found not to be lateralized so completely, do much better on verbal tests. Does this

mean that it is better not to be lateralized?

One other issue is involved here as well that is related to the issue of lateralization and the right hemisphere. Emotions are lodged, primarily, in the right hemisphere. If males are more lateralized than females, it may turn out that lateralization is one reason for the disproportionate numbers of males who are dyslexic, aphasic, have difficulty with reading and who stutter. And inability to access freely the right hemisphere might also account for the fact that males commit almost all violent crimes. The right hemisphere is mute; it cannot express directly its feelings and must rely on left hemisphere language skills to do that. In women, this would be relatively easy because of women's language ability and less lateralized brain. In men it is not. Some scientists argue, therefore, that it is men--who are not in contact with their emotions--who commit crimes of passionless violence and that it is women--in contact with those feelings--who react not with violence to their world but with moods and emotional responses, especially depression.[27] If all this seems confusing, it is. That is because the brain has become a political battleground, and it will be unclear for a long time just what all this brain research comes down to.

In the interim, we must ask what all this has to do with images of women. Some of that answer is obvious as we watch the new Eighties woman that is being constructed from this research. There are, however, other issues involving images that I would like to address. My research has been in the area of iconography, that is the study of the class of images that have a significance beyond their actual representational value. An icon--and the word originally referred to pictures of saints--is a special class of image; it is a picture that carries both representational and cultural meaning. When we see a poster of a movie star or a rock idol, we see it as more than an image of a person. We see in the image a constellation of

values, virtues, attractions. It is the iconicity of an image that allows us to know that a particular figure in a western is more than a cowboy, that he is a representative of American values and ideas. Icons have a profound effect upon us. They teach us what is good, beautiful, worth our homage and adoration. They are the very stuff of the mass media.[28] Iconographic figures placed in highly patterned formats are constructs used by the mass media as a kind of shorthand. We all know them quite well. They allow us to tune in most television shows in the final minutes and figure out the gist of what must have occurred. Both the patterns and the figures that appear in them are well documented in the mass media.[29]

What is of interest in this context is the relationship of mass mediated images and brain research. Sex differences aside for the moment, you will recall that the left hemisphere is the articulate, conscious self. The right hemisphere is almost non-verbal, and is responsible for the processing of pictures, patterns, images, and musical sense. Studies of Gazzaniga and LeDoux[30] have shown that although both hemispheres normally work in concert, they are capable of carrying on different and simultaneous functions. Although the left hemisphere is dominant during wakefulness, it is by no means uninfluenced by the other half of the brain. In a way the left hemisphere's job is to construct a verbal presentation of reality shaped silently by right brain activities.

Recently, Gazzaniga and LeDoux have been working with a subject named P. S. whose corpus callosum has been severed surgically. Paul was simultaneosly presented with two different tasks, one to each hemisphere. On the left of a large screen, Paul was presented with a winter scene complete with snowman, and on the right of the screen was projected a large chicken foot. The pictures were projected so that each hemisphere could only see one picture. From eight pictures in front of him, Paul was asked to select

those related to what he saw on the screen. He did this simultaneously. Paul's right hand selected a photograph of a rooster because his left hemisphere saw the chicken foot. His left hand selected a shovel because his right hemisphere saw a snow scene. What is of most interest is not the choices but Paul's explanation of them. When asked "What do you see?" He answered, "I saw a claw and I picked the chicken, and you have to clean out the chicken shed with a shovel." Gazzaniga's and LeDoux' interpretion of this data is highly significant:

> In trial after trial, we saw this kind of response. The left hemisphere could easily and accurately identify why it had picked the answer, and then subsequently, and without batting an eye, it would incorporate the right hemisphere's response into the framework. While we knew exactly why the right hemisphere had made its choice, the left hemisphere could merely guess. Yet, the left hemisphere did not offer its suggestion in a guessing vein but rather a statement of fact as to why that card had been picked.[31]

These researchers suggest that it is the function of the left hemisphere to <u>construct</u> reality based on our actual behavior when it is not always privy to the origin of these actions. Obviously the condition found in P. S. with his severed corpos callosum is an extreme, but it points out the relationship of the right hemisphere to the left and shows its influence upon it.

The right brain affects the left one in normal people as well. We must access it to remain healthy and creative. Much of that accessing is done in a non-conscious state. Partly this is because our culture is left-brain oriented and partly because this is the way nature planned it. The left brain, which dominates waking loses dominance, or is otherwise occupied, during sleep in which dreaming occurs. D-state sleep, as it is called, frees the right brain to function unsupressed and unmonitored by the left brain. Although there is a lot of disagreement about all of the purposes of dreaming (see Deming, "The Two Dream Machines"[32]), it is clear that during D-state sleep important functions occur that are blocked during waking. Memory data

are assembled and rearranged much more freely than they can be when the conscious left brain is in control. As a result, freed from the pressure of social acceptability, linearity, and "sense" in the conventional and limiting meaning of the world, the right brain creates new cognitive maps, explores new symbolic constellations, and to borrow a phrase from Ursula LeGuin, is distanced from the ordinary. In other words, when we access the right brain, we are being creative, developing solutions. The right hemisphere is essential to our ability to respond creatively to the world, and we do that most easily in D-state sleep. The right hemisphere must be able to communicate to the left hemisphere or else these creative solutions found in dream have no chance of being translated into the waking world. Patients with artifically severed hemispheres report no dreaming; without access to the conscious mind, the right brain cannot share its revelations.[33]

What then is the material that the right brain uses in its creative processes? Approximately eight percent of all information we receive is visual, and in a culture as permeated with the mass media as this one is, much of the visual information we receive is prepackaged in the form of the icons and patterns I mentioned earlier. We must ask, then what the effects of such mediated imagery might be. The packaged reality of television and film has come under a lot of criticism and is increasingly being faulted by people in other countries because of the ideological content inherent in our highly patterned cultural products. Developing countries are rebelling against imported American media products because they recognize that mediated images offer both entertainment and ideological instruction, even when the latter is not their deliberate intent. Other writers have had a lot more to say about mediated images and international politics.[34] What is of interest here is what the mass media are saying in the same covert way about women. The dominant images of women in the mass media has been discussed

in a variety of places, and the results are known to most of us.[35] The way the brain uses these images and the ultimate effect they have on our vision of reality is less well understood.

First, let us consider for the moment the idea that there may be actual differences in male and female brains caused by the action of hormones on the developing tissue. If that is so, then that information coupled with our knowledge of what weaknesses exist in male, highly lateralized brains raises some intriguing possibilities. A high proportion of violent crime is committed by males and this has been linked by some researchers with the effect of testosterone in the bloodstream and on the organization of the brain itself. Because males dominate the mass media industries, it is perhaps not at all surprising that the kind of shows that predominate--and receive critical censure--are those reflecting the same deficiencies; that is, an excess of gratuitous violence and an emphasis on sexuality divorced from emotion. The effects of this sort of content in the mass media have been known for a long while; children exposed to violence on television, for instance, exhibit more violent behavior.[36]

If men think differently from women, that must mean that the products of those different thoughts must differ as well. Because men dominate the image-producing media, the visions that they create for us may well be male in some fundamental way. The idea calls into question the "universality" of many of the genres so pervasive in the mass media. Perhaps genres, which we tend to think of as absolutes and as above politics in some way, are male explanations of the world rather than archetypes. If there is such a thing as male mentation, then women are in even more jeopardy than we thought when we rejected the silly and demeaning images of women we found in the mass media. The jeopardy arises from the fact that images are processed by the right brain and therefore become part of the store of visual data that is

manipulated during D-state sleep and during waking creative periods. If these images come from the male mind and are not optimally suited for female mental processing, it might well be that the right brains of women are hampered in finding solutions to problems suitable to the way their brains see the world. The images that inhabit our nightlives, our dream universes, might well be alien to us. The solutions we derive from a mountain of data in some way not directly aimed at us might not solve anything at all.

If there are basic brain organizational differences, then it is imperative that we have access to image-producing media so we can create images that speak directly to our needs, that enhance our creativity, that maximize our strengths. We cannot be content with just tinkering with the model--adding a few women here, changing a few male characters into females there. We may have to be prepared to come up with some altogether new models--new images and new patterns in which to place them. A number of possibilities come to mind. Perhaps instead of action programming, women would create speech-oriented programming focusing on communication and interpersonal relations. If rulebound, solution-oriented television is male, perhaps flexibly timed programs would be more suitable. Who said that shows on television had to last 30, 60, or 90 minutes each week? If as some critics have suggested the idea of plot consisting of rising action, a climax, and falling action was modeled after male sexuality rather than aesthetic principles, who knows what shows that did not have to reach a single, loose-ends-tied solution in thirty minutes would be like. And for that matter, who is to say what kinds of images of women and of men women whose minds are not stuffed with alien thoughts might create. If our brains are different, then the mass media must foster that diversity.

On the other hand, if the differences between the male and female brain are insignificant or non-existent, then there is still a great need to make

changes in images because we are a product of their socialization. Here again the importance of control of the image-producing media surfaces. Because men dominate in the creation of mediated reality, it is their socialized vision that prevails. As a result, our dreams, our right hemispheres, are inhabited by visions that are not in our best interest. The solutions we arrive at via accessing the right hemisphere will be those solutions that males have, to a large extent, created for us, provided for us on television or in films, and that we have rehearsed in our sleep, coming--whether we like it or not--to conclusions that do not serve us well. How can we be surprised to find, if this is the case, that it is women who are the most outspoken opponents of women's rights. And why should we be shocked to discover that children who are heavy television users are more likely to have traditional expectations of women and to be more conservative about women's rights? If we are alike in our cognitive processes, then equality must be fostered.

Equality can only be fostered by freeing up, in some meaningful way, the functioning of the right hemisphere. Strategies for change, for shaping a new social structure seem unlikely to occur if all that is being channeled into the data repository of the right brain is stereotypes that are detrimental to women. New icons need to be created, and some deliberate alterations need to take place. There are some models for this kind of change. Cuba, for example, decided to make changing the image of women a national priority and gave governmental support to the creation of new images.[37] Women science fiction writers including LeGuin, Piercy, Lessing, and Butler[38] are trying to do the same thing by imagining worlds in which the exceptional woman is no exception.[39] Visionary women artists such as the surrealists have deliberately tried to see beyond the ordinary and to create images of transcendence based on their own dream visions.[40] Women's culture needs to find its way into the mass media in some more pervasive way

than a once-a-week quilting show on public television.

With current projections, it will take between five and twenty years for the dust to settle over the controversy engendered by the split brain research. That long is needed because research techniques just do not exist to allow us to study the human brain while it is functioning. During that time we must be vigilant, even if we are not directly involved in the research and controversy. At the least, we should be observant critics of the mass media, supporting those visions we know to be strengthening. The cost to us if we are not vigilant is greater than the failure of the ERA to pass. Widescale manipulation of the brain of research animals with male hormones is a thing of the present. Already researchers such as Gunther Dorner are suggesting that mothers, who fear their sons might be homosexuals because stress that they are experiencing might be blocking some of the male hormone from reacting with the fetus, might want to have testosterone treatments to guarantee normal sons.[41] If the male model of the brain becomes the standard, who is to predict that women's brains will be safe from manipulation. We have already seen what the cost to a woman's health the manipulation of hormones can be with the DES daughters. The cost to our mental and creative health of less obvious forms of manipulation remains to be determined.

ENDNOTES

[1] "Sex Differences in Mathematical Ability: Fact or Artifact?" Science 210 (12 Dec 1980), 1262-264.

[2] Jo Durden-Smith and Diane DeSimone, Playboy (January-July, 1982); Vivian Gornick, Ms, "Watch Out: Your Brain May Be Used Against You," (April, 1982), pp. 14-20.

[3]John Eccles, The Understanding of the Brain, 2nd ed. (New York: McGraw-Hill, 1977); Roger Sperry, "Brain Bisection and Consciousness," in Brain and Conscious Experience, ed. J. Eccles (New York: Springer-Verlag, 1966); M. S. Gazzaniga, The Bisected Brain (New York: Appleton-Century-Crofts: 1970); Robert Ornstein, The Psychology of Consciousness (New York: Renguin, 1975); and many others.

[4]See above and Jerre Levy, "Psychobiological Implications of Bilateral Asymmetry In Hemispheric Disconnection in the Human Brain," ed. S. Dimond and G. Beaumont (New York: Halsted Press, 1974); S. P. Springer and M. S. Gazzaniga, "Dichotic Listening in Partial and Complete Split Brain Patients," Neuropsychologia 13 (1975), pp. 341-346; S. Harnad, R. Doty, L. Goldstein, J. Jaynes, and G. Krauthamer, eds. Lateralization in the Nervous System (New York: Academic Press, 1977); and many others.

[5]Ornstein, The Psychology of Consciousness.

[6]Ornstein, pp. 80-81.

[7]Ornstein, pp. 82-83.

[8]Playboy (March 1982), and cited in Gornick, p. 17.

[9]The somewhat erratic use of women/them/they and women/we in not accidental. Much of what is reported here is highly speculative notions about women's nature. Often it is offensive as well speculative. It does not seem appropriate that we should claim others' constructions of our nature as our own.

[10]Playboy (March, 1982), p. 145.

[11]Playboy (March, 1982), p. 214.

[12]Ibid.

[13]Diane McGuinness, UC Santa Cruz and Stanford; Jerre Levy, U. of Chicago; Doreen Kimura, U. of Western Ontario; Marian Diamond, UC Berkeley, et al. Most data given in the Playboy series appears without any researcher attached to it and no sources--articles, books, etc.--are given. These researchers cited may or may not support the uses to which their research is being directed.

[14]Jo Durden-Smith, "Male and Female--Why?" Quest/80 (October, 1980), pp. 19, 96, et passim; Playboy, "The Sex Chemicals," (April, 1982), p. 232. Mark E. Guney and Masakau Konishi, "Hormone-Induced Sexual Differentiation of Brain and Behavior in Zebra Finches," Science, 208, (June 20 1980), 1380-83.

[15]Ibid.

[16]Quest/80 Playboy (April, 1982), p. 236ff.

[17]Quest/80, p. 96.

[18]Ibid.

[19](20 May 1982); cited in Science News, 121: 22 (29 May 1982), 356.

[20]Science News, 121:22 (29 May 1982), 356.

[21]See Quest/80 and Playboy series cited above.

[22]Playboy (March, 1982), p. 218.

[23]Sally R. Springer and Georg Deutsch, Left Brain, Right Brain (San Francisco: W. H. Freeman and Company, 1981), p. 129.

[24]Ibid.

[25]Left Brain, Right Brain, pp. 129-30.

[26]Gornick, p. 17.

[27]Playboy (April, 1982), p. 226-228.

[28]See Billie J. Wahlstrom, "Images of the Family in the Mass Media: An American Iconography?" Changing Images of the Family, Virginia Tufte and Barbara Myerhoff, eds. (New Haven: Yale University Press, 1979), pp. 193-227.

[29]Horace Newcomb, TV: The Most Popular Art (New York: Doubleday/Anchor, 1974); John G. Cawelti, Adventure, Mystery and Romance (Chicago: University of Chicago Press, 1976), among others.

[30]Left Brain, Right Brain, pp. 197ff.

[31]Left Brain, Right Brain, pp. 198-99ff; M. S. Gazzaniga and J. E. LeDoux, The Integrated Mind (New York: Plenum Press, 1978).

[32]"The Two Dream Machines: Television and the Human Brain," Public Communication Review, 1:1 (Fall 1981), 5-9.

[33]Ornstein, p. 80.

[34]See the work of David Kunzel; Caren Deming, "Television and Human Fantasy Life: Implications for the Developing World," Telecommunications in Transcultural Perspective: Papers Delivered at the Conference on Television in the Developing World (Winnepeg, Canada: University of Winnepeg, 1980), J. Steinbring and G. Granzberg, eds.

[35]Molly Haskell, From Reverence to Rape: The Treatment of Women in Movies (New York: Holt, Rinehart & Winston, 1973); Marjorie Rosen, Popcorn Venus: Women, Movies and the American Dream (New York: Avon, 1974); Kathryn Weibel, Mirror Mirror: Images of Women Reflected in Popular Culture (Garden City, NJ: Anchor, 1977); Gaye Tuchman, et al., eds. Hearth & Home: Images of Women in the Mass Media (New York: Oxford, 1978), Matilda Butler and William Paisley, Women and the Mass Media (New York: Human Sciences Press, 1981).

[36]A. Bandura, "Social-learning Theory of Identificatory Processes," Handbook of Socialization Theory and Research (Chicago: Rand McNally, 1969).

[37]Caren Deming, "The Public Arts as Instruments of Social Change: The Cuban Case," a paper presented at the National Women's Studies Conference, Humboldt State University, Arcata, Calif., 1982.

[38]Ursula LeGuin, The Left Hand of Darkness; Marge Piercy, Woman on the Edge of Time; Olivia Butler, Mind of My Mind; Doris Lessing, the Canopus in Argos: Archives collection are examples of a growing number of feminist science fiction writers and their works.

[39]To paraphrase Pamela Sargent, ed. Women of Wonder (New York: Vintage, 1974), p. ix.

[40]Gloria Ornstein, "Female Creation: The Quest for the Great Mythic Mother," a paper presented at the National Women's Studies Association Conference, Humboldt State University, Arcata, Calif., 1982.

[41]Quest/80; Playboy.